What is claimed is:

1. An apparatus for controlling an electric motor comprising:

a mechanical system provided with a load machine, a transmission mechanism to transmit power, and an electric motor that drives said load machine via said transmission mechanism;

a simulator portion provided with a numerical model including said mechanical system, a simulation controlling portion to provide said numerical model with a torque instruction by using an observable quantity of state of said numerical model, and an evaluation portion to provide said simulation controlling portion and real controlling portion with control parameters; and

a real controlling portion having the same structure as that of said simulator portion, in which an observable quantity of state from the real system is used as an input; and wherein said real controlling portion supplies a torque signal to said electric motor that is a drive source.

2. The apparatus for controlling an electric motor as set forth in Claim 1, wherein said apparatus is provided with a means for supplying control parameters, which are obtained by the evaluation portion of said simulation portion to the real control portion after said simulation portion is driven prior to a real operation and a simulation evaluation function for evaluating the behaviors of said numerical model satisfies the initial conditions established in advance.

3. The apparatus for controlling an electric motor as set forth in Claim 2, wherein said apparatus is provided with said numerical model that provides a simulation speed signal and a simulation position signal based on a simulation torque with respect to a given real position instruction; a simulation PI controlling portion that provides a simulation torque instruction to said numerical model on the basis of the simulation speed signal and simulation position signal of said numerical model; and a real PI controlling portion that provides a real torque signal on the basis of said real position instruction, real position signal and real speed signal.

4. The apparatus for controlling an electric motor as set forth in Claim 2, wherein said apparatus is provided with a numerical model that provides a simulation position signal on the basis of a simulation torque instruction with a respect to a given real position instruction; a simulation PID controlling portion that provides said numerical model with said simulation torque instruction on the basis of a simulation position signal of said numerical model; and a real PID controlling portion that provides a real torque signal on the basis of said real position instruction and said real position signal.

5. The apparatus for controlling an electric motor as set forth in Claim 2, wherein said apparatus is provided with a numerical model that provides a simulation speed signal on the

basis of a simulation torque instruction with respect to a given real speed instruction; a simulation PID controlling portion that provides said numerical model with a simulation torque instruction on the basis of said simulation speed signal of said numerical model; and a real PI controlling portion that provides a real torque signal on the basis of said real speed instruction and real speed signal.

6. The apparatus for controlling an electric motor as set forth in Claim 3, wherein said apparatus is provided with a simulation controlling portion consisting of a simulation PID controlling portion, which provides said numerical model with a simulation torque instruction on the basis of the simulation speed signal and simulation position signal of said numerical model, and a simulation compensating portion; and a real controlling portion consisting of a real PID controlling portion that provides a real torque signal based on the real position instruction, real position signal and real speed signal, and a real compensating portion.

7. The apparatus for controlling an electric motor as set forth in Claim 4, wherein said apparatus is provided with a simulation controlling portion consisting of a simulation PID controlling portion, which provides said numerical model with a simulation torque instruction on the basis of the simulation position signal of said numerical model, and a simulation compensating portion; and a real controlling portion

consisting of a real PID controlling portion, which provides a real torque on the basis of the real position instruction and real position signal; and a real controlling portion.

8. The apparatus for controlling an electric motor as set forth in Claim 5, wherein said apparatus is provided with a real controlling portion consisting of a simulation PI controlling portion that provides said numerical model with a simulation torque instruction on the basis of a simulation speed signal of said numerical model, a simulation compensating portion, a real PI controlling portion that provides a real torque signal on the basis of a real speed instruction and said real speed signal, and a real compensating portion.

9. The apparatus for controlling an electric motor as set forth in Claim 3, wherein said apparatus is provided with a simulation controlling portion that is constructed of a simulation PID controlling portion, which provides said numerical model with a simulation torque instruction on the basis of a simulation speed signal of said numerical model and a simulation position signal thereof, and a simulation controlling portion consisting of a plurality of types of simulation compensators; and a real controlling portion that is constructed of a real PID controlling portion, which provides a real torque signal on the basis of a real position instruction, said real position signal and said real speed signal, and a real compensating portion consisting of a plurality of types

of said simulation compensators.

10. The apparatus for controlling an electric motor as set forth in Claim 4, wherein said apparatus is provided with a simulation controlling portion that is constructed of a simulation PID controlling portion, which provides said numerical model with a simulation torque instruction on the basis of a simulation position signal of said numerical model, and a simulation compensating portion consisting of a plurality of types of simulation compensators; and a real controlling portion that is constructed of a real PID controlling portion, which provides a real torque signal on the basis of a real position instruction and said real position signal, and a real compensating portion consisting of a plurality of simulation compensators.

11. The apparatus for controlling an electric motor as set forth in Claim 5, wherein said apparatus is provided with a simulation controlling portion that is constructed of a simulation PI controlling portion, which provides said numerical model with a simulation torque instruction on the basis of a simulation speed signal of said numerical model, and a simulation compensating portion consisting of a plurality of types of simulation compensators; and a real controlling portion that is constructed of a real PI controlling portion, which provides a real torque signal on the basis of a real speed instruction and said real speed signal, and a real compensating

portion consisting of a plurality of simulation compensators.

12. An apparatus for controlling an electric motor, further comprising a means for preparing a numerical model by using an observable quantity of state, which is obtained by driving the real system based on the initial controlling parameters initially established by the real controlling portion, and an initial torque instruction given to a real driving portion in the initial state where said numerical model of said simulator portion is constituted; driving the real system after the controlling parameters are provided; re-determining said numerical model of the simulator portion by, where the behaviors of the real system do not satisfy the on-real running evaluation function established in advance, using the real running torque instruction at that time and the observable quantity of the real running state of the real system; and re-starting the simulator portion to re-determine the controlling parameters.

13. The apparatus for controlling an electric motor as set forth in Claim 12, wherein said apparatus includes a simulation controlling portion that is constructed of a simulation PID controlling portion, which provides said numerical model with a simulation torque instruction on the basis of a simulation speed signal of said numerical model and simulation position signal thereof, and a simulation compensating portion consisting of a plurality of types of simulation compensators;

and a real controlling portion that is constructed of a real PID controlling portion, which provides a real torque signal on the basis of a real position instruction, said real position signal and said real speed signal, and a real compensating portion consisting of a plurality of simulation compensators.

14. The apparatus for controlling an electric motor as set forth in Claim 12, wherein said apparatus includes a simulation controlling portion that is constructed of a simulation PID controlling portion, which provides said numerical model with a simulation torque instruction on the basis of a simulation position signal of said numerical model, and a simulation compensating portion consisting of a plurality of types of simulation compensators; and a real controlling portion that is constructed of a real PID controlling portion, which provides a real torque signal on the basis of a real position instruction and said real position signal, and a real compensating portion consisting of a plurality of simulation compensators.

15. The apparatus for controlling an electric motor as set forth in Claim 12, wherein said apparatus includes a simulation controlling portion that is constructed of a simulation PI controlling portion, which provides said numerical model with a simulation torque instruction on the basis of a simulation speed signal of said numerical model, and a simulation compensating portion consisting of a plurality of types of simulation compensators; and a real controlling portion that

is constructed of a real PI controlling portion, which provides a real torque signal on the basis of a real speed instruction and said real speed signal, and a real compensating portion consisting of a plurality of simulation compensators.

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